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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/689,817	10/13/2000	Masaki Fujiwara	NEC00P260-ki	7075

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EXAMINER	
TSANG FOSTER, SUSY N	
ART UNIT	**PAPER NUMBER**
1745	16

DATE MAILED: 10/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/689,817	Applicant(s) FUJIWARA ET AL.
	Examiner Susy N Tsang-Foster	Art Unit 1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2003 and 06 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10 and 17-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *2-4,6,7,9,10,18,19 and 25* is/are allowed.

6)☒ Claim(s) *1,5,8,17,20-24 and 26-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/25/2003 has been entered.

Response to Amendment

2. This Office Action is responsive to the amendment filed on 6/25/2003. Claims 1, 17, and 26 have been amended. Claims 1-10, and 17-33 are pending. Claims 2-4, 6, 7, 9, 10, 18, 19, and 25 are allowed. Claims 1, 5, 8, 17, 20-24, and 26-33 are rejected for reasons given below.

Claim Objections

3. Claims 17, 32, and 33 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. In claim 17, the preamble "[t]he secondary battery according to claim 2" fails to further limit claim 2 which is drawn to a molded electrode in the preamble. Claims 32 and 33 depending from claim 17 are also rejected for the same.

4. Claims 27 and 29 are objected to because of the following informalities:

In claim 27, some of the polymer names appear to be misspelled.

In claim 29, some of the plasticizer names appear to be misspelled.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 5, 8, 17, 20-24, and 26-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, the limitation "wherein said plasticizer comprises a material for facilitating molding of the electrode and enhancing the shape retainability after molding, and is present when the electrode is in operation" is indefinite because it is unclear what the operation is.

In claim 17, the preamble "[t]he secondary battery according to claim 2" is indefinite because claim 2 is not drawn to a secondary battery.

In claim 27, the limitation "at least one of an aniline, an aniline derivative, a pyrrole, a pyrrole derivative, a thiopene, a thiopene derivative, and polynapthylene" is indefinite because it is unclear what these derivatives are and there are innumerable possibilities.

Claims depending from claims rejected under 35 USC 112, second paragraph are also rejected for the same.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 5, 20, 21, 24, and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over the IPDL JPO Machine Translation for JP 08-064200 A in view of Boer et al. (US 5,656,393).

It is also noted that the product-by-process limitations of claims 1 and 21 are not given patentable weight since the courts have held that patentability is based on a product itself, even if the prior art product is made by a different process (see In re Thorpe, 227 USPQ 964, (CAFC 1985), In re Brown, 173 USPQ 685 (CCPA 1972), and In re Marosi, 218 USPQ 289, 292-293 (CAFC 1983)).

In claim 1, the limitations "molded electrode", "being molded", and "facilitating molding of the electrode and enhancing the shape retainability after molding" are product-by-process limitations.

In claim 21, the limitation "said electrode material is hot pressed with said current collector sheet" is a product-by-process limitation.

The IPDL JPO Machine Translation for JP 08-064200 A disclose an electrode comprising an electrode material comprising a polymer active material such as polypyrrole, polyaniline, polythiophene, a conductivity enhancing agent and a plasticizer, a current collector where the electrode material mixture is formed onto the current collector and dried such that the electrode material and the current collector are adhered together into one piece and the plasticizer remains in the active material (see paragraphs 8-10, 13, 18 of machine translation). The current collector used in the electrode inherently possesses a volume and the thickness of electrode material selected determines the ratio between a volume of the electrode material to a volume of the current collector.

The plasticizer can be dibutyl phthalate (DBP), diethylhexyl adipate (DOA) in the amount of 0.1 to 5 wt% to the active material and these plasticizers have a boiling point of 200 °C or more and a vapor pressure that is below 5 mmHg at 85 degrees C (see paragraph 19 of machine translation). The machine translation also discloses that the coating thickness of the electrode material mixture on the current collector is 20 to 100 microns (see paragraph 15 of machine translation).

The JPO Machine translation for the reference does not disclose that the electrode material comprises a thickness of 300 microns to 9 mm and formed on at least one side of the current collector sheet.

Boer et al. teach that the particular thickness of the active material layer of an electrode depends on the battery design and its acceptable drain rate and can be customized by the artisan (col. 8, lines 34-37).

It would have also been obvious to one of ordinary skill in the art at the time the invention was made to have the thickness of the positive electrode material be 300 microns to 9 mm because the thickness of the electrode active material layer depends on the application requirements of the battery such as the drain rate requirements and the battery design.

9. Claims 8 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over the IPDL JPO Machine Translation for JP 08-064200 A in view of Boer et al. (US 5,656,393) and as evidenced by Poehler et al. (US 5,637,421).

The IPDL JPO Machine Translation for JP 08-064200 A in combination with Boer et al. (US 5,656,393) (see paragraph above) discloses all the limitations of claims 8 and 26 except explicitly disclosing that the electrode material has an unevenness at the surface of the molded electrode.

However, no electrode material surface is perfectly flat so there will inherently be some degree of unevenness on the surface of the electrode material in the electrode.

As evidenced by Poehler et al., a film of polypyrrole active material inherently has a rough surface (col. 6, lines 28-37).

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over the IPDL JPO Machine Translation for JP 08-064200 A in view of Boer et al. (US 5,656,393) as applied to claim 1 above and further in view of Koksbang et al. (US 5,424,151).

The IPDL JPO Machine Translation for JP 08-064200 A in combination with Boer et al. (US 5,656,393) disclose all the limitations of claim 23 except that the current collector sheet comprises a thickness of no more than about 100 microns.

Koksbang et al. teach that in practice the thickness of a current collector for a positive electrode comprising polymer active material ranges from about 5 microns to about 25 microns in order to minimize the overall thickness of the battery (col. 6, lines 1-13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a current collector ranging from about 5 microns to about 25 microns because using a current collector of this thickness minimizes the overall thickness of the battery that is suitable for portable electronic devices.

11. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over the IPDL JPO Machine Translation for JP 08-064200 A in view of Boer et al. (US 5,656,393) as applied to claim 1 above and further in view of Koksbang et al. (US 5,424,151).

The IPDL JPO Machine Translation for JP 08-064200 A in combination with Boer et al. (US 5,656,393) (see above) disclose all the limitations of claim 30 except that the conductivity enhancing agent comprises particles with a diameter of no more than 20 microns.

The IPDL JPO Machine Translation for JP 08-064200 A do disclose conductive carbon powder such as acetylene black, activated carbon powder and graphite powder as an electronic conduction assistant in the electrode (see paragraphs 13 of machine translation).

Koksbang et al. teach carbon black having average particle size of about 10 to 100 nm as a conductivity enhancing agent for a polymer active material because carbon black having this fine particle size have large surface areas that are suitable for improving conductivity in the polymer active material (col. 10, lines 56-68 and col. 11, lines 1-8) .

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use carbon black having an average particle size of about 10 to 100 nm as a conductivity enhancing agent when a polymer active material is used as the active material for the electrode because carbon black having this fine particle size have large surface areas that are suitable for improving conductivity in the polymer active material.

12. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over the IPDL JPO Machine Translation for JP 08-064200 A in view of Boer et al. (US 5,656,393) as applied to claim 1 above and further in view of Tasaka et al. (US 6,280,854 B1).

The IPDL JPO Machine Translation for JP 08-064200 A in combination with Boer et al. (US 5,656,393) (see above) disclose all the limitations of claim 31 except that the weight ratio of the polymer active material to the conductivity-enhancing agent is in the range of 50:50 to 90:10 in the electrode.

Tasaka et al. teach a polymer electrode comprising polymer active material and conductivity agent where the weight ratio of the polymer active material to the conducting agent is 89:11 (see Example 6 in col. 8, lines 58-65) and the amount of conductivity agent used to determine this weight ratio is effective to improving the conductivity of the amount of polymer active material in the electrode (col. 5, lines 18-28).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a weight ratio of 89:11 for the weight ratio of the polymer active material to the conducting agent because this weight ratio is effective for improving the conductivity of the amount of polymer active material in the electrode.

13. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over the IPDL JPO Machine Translation for JP 08-064200 A in view of Boer et al. (US 5,656,393) as applied to claim 1 above, and further in view of Shacklette et al. (US 4,695,521).

The IPDL JPO Machine Translation for JP 08-064200 A in combination with Boer et al. (US 5,656,393) (see above) disclose all the limitations of claim 22 except that the electrode material includes a porosity of 20-30% in volume.

Shacklette et al. teach that the porosity of the polymer active material should be at least 20% in volume such that the polymers are sufficiently porous to allow the inflow and outflow of electrolyte solvent containing dissolved alkali metal cations and to provide sufficient space for the deposition of elemental alkali metal inside of the conjugated backbone polymer substrate during charging and discharging of the battery (col. 3, lines 33-65) and the porosity of the

polymer active material can be adjusted by applying a final pressing and heat setting step to a formed electrode (col. 5, lines 30-35).

Thus, Shacklette et al. is clearly teaching that the porosity of the electrode material is a results effective variable. The courts have held that optimization of a results effective variable is not novel. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the porosity of the electrode material to at least 20% in volume by applying a final pressing and heat setting step to a formed electrode of JP 08-064200 A because a porosity of at least 20% in volume would be sufficiently to allow the inflow and outflow of electrolyte solvent containing dissolved alkali metal cations and to provide sufficient space for the deposition of elemental alkali metal inside of the conjugated backbone polymer substrate during charging and discharging of the battery.

14. Claims 1, 5, 20-22, 24 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shacklette et al. (4,695,521) in view of the IPDL JPO Machine for JP 08-064200 A and Boer et al. (US 5,656,393).

Shacklette et al. disclose a molded electrode comprising an electrode material comprising a polymer active material, a conductivity enhancing agent, a current collector sheet, the electrode material and the current collector sheet being molded into one piece (col. 1, lines 60-68; col. 5, lines 19-50; col. 4, lines 57-62). The electrode mixture formed on the current collector is heat pressed to the current collector in a final step to adjust the desired porosity (col. 5, lines 19-36).

The porosity of the electrode material is at least 20 volume percent, at least about 25 volume percent, or from about 30 to about 70 volume percent (col. 3, lines 32-49). The polymer active material can be polythiophene, polyaniline, polypyrrole, and polynaphthalene (col. 1, lines 15-40 and col. 4, line 2).

The current collector used in the electrode inherently possesses a volume and the thickness of electrode material selected determines the ratio between a volume of the electrode material to a volume of the current collector. The current collector can be a platinum screen (col. 8, line 2) or a nickel grid (col. 8, line 20), both of which are mesh current collectors.

Shacklette et al. do not disclose that the electrode material comprises a thickness of 300 micron to 9 mm formed on at least one side of the current collector and that the electrode comprises a plasticizer.

The IPDL JPO Machine Translation for JP 08-064200 A teaches adding a plasticizer such as dibutyl phthalate (DBP) and diethylhexyl adipate (DOA) in the amount of 0.1 to 5 wt% to the active material (these plasticizers inherently have a boiling point of 200 °C or more and a vapor pressure that is below 5 mmHg at 85 degrees C) into an electrode containing polymer active material in order to improve adhesion of the electrode material with a substrate such as a current collector (see paragraphs 8 and 18 of machine translation).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add 0.1 to 5 wt% of plasticizer such as dibutyl phthalate (DBP), diethylhexyl adipate (DOA) to an electrode mixture comprising polymer active material because this amount of plasticizer in the electrode mixture comprising polymer active material improves the adhesion of the electrode mixture to the current collector.

Boer et al. teach that the particular thickness of the active material layer of an electrode depends on the battery design and its acceptable drain rate and can be customized by the artisan (col. 8, lines 34-37).

It would have also been obvious to one of ordinary skill in the art at the time the invention was made to have the thickness of the positive electrode material be 300 microns to 9 mm because the thickness of the electrode active material layer depends on the application requirements of the battery such as the drain rate requirements and the battery design.

15. Claims 8 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shacklette et al. (4,695,521) in view of the IPDL JPO Machine for JP 08-064200 A and Boer et al. (US 5,656,393) and as evidenced by Poehler et al. (US 5,637,421).

Shacklette et al. in combination with the IPDL JPO Machine Translation for JP 08-064200 A and Boer et al. (US 5,656,393) (see above) disclose all the limitations of claims 8 and 26 except explicitly disclosing that the electrode material has an unevenness at the surface of the molded electrode.

However, no electrode material surface is perfectly flat so there will inherently be some degree of unevenness on the surface of the electrode material in the electrode.

As evidenced by Poehler et al., a film of polypyrrole active material inherently has a rough surface (col. 6, lines 28-37).

16. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shacklette et al. (4,695,521) in view of the IPDL JPO Machine for JP 08-064200 A and Boer et al. (US 5,656,393) as applied to claim 1 above and further in view of Koksbang et al. (US 5,424,151).

Shacklette et al. (4,695,521) in combination with the IPDL JPO Machine for JP 08-064200 A and Boer et al. (US 5,656,393) disclose all the limitations of claim 23 except that the current collector sheet comprises a thickness of no more than about 100 microns.

Koksbang et al. teach that in practice the thickness of a current collector for a positive electrode comprising polymer active material ranges from about 5 microns to about 25 microns in order to minimize the overall thickness of the battery (col. 6, lines 1-13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a current collector ranging from about 5 microns to about 25 microns because using a current collector of this thickness minimizes the overall thickness of the battery that is suitable for portable electronic devices.

17. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shacklette et al. (4,695,521) in view of the IPDL JPO Machine for JP 08-064200 A and Boer et al. (US 5,656,393) as applied to claim 1 above and further in view of Koksbang et al. (US 5,424,151).

Shacklette et al. (4,695,521) in combination with the IPDL JPO Machine for JP 08-064200 A and Boer et al. (US 5,656,393) (see above) disclose all the limitations of claim 30

except that the conductivity enhancing agent comprises particles with a diameter of no more than 20 microns.

The IPDL JPO Machine Translation for JP 08-064200 A do disclose conductive carbon powder such as acetylene black, activated carbon powder and graphite powder as an electronic conduction assistant in the electrode (see paragraphs 13 of machine translation).

Koksbang et al. teach carbon black having average particle size of about 10 to 100 nm as a conductivity enhancing agent for a polymer active material because carbon black having this fine particle size have large surface areas that are suitable for improving conductivity in the polymer active material (col. 10, lines 56-68 and col. 11, lines 1-8) .

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use carbon black having an average particle size of about 10 to 100 nm as a conductivity enhancing agent when a polymer active material is used as the active material for the electrode because carbon black having this fine particle size have large surface areas that are suitable for improving conductivity in the polymer active material.

18. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shacklette et al. (4,695,521) in view of the IPDL JPO Machine for JP 08-064200 A and Boer et al. (US 5,656,393) as applied to claim 1 above and further in view of Tasaka et al. (US 6,280,854 B1).

The IPDL JPO Machine Translation for JP 08-064200 A in combination with Boer et al. (US 5,656,393) (see above) disclose all the limitations of claim 31 except that the weight ratio of

the polymer active material to the conductivity-enhancing agent is in the range of 50:50 to 90:10 in the electrode.

Tasaka et al. teach a polymer electrode comprising polymer active material and conductivity agent where the weight ratio of the polymer active material to the conducting agent is 89:11 (see Example 6 in col. 8, lines 58-65) and the amount of conductivity agent used to determine this weight ratio is effective to improving the conductivity of the amount of polymer active material in the electrode (col. 5, lines 18-28).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a weight ratio of 89:11 for the weight ratio of the polymer active material to the conducting agent because this weight ratio is effective for improving the conductivity of the amount of polymer active material in the electrode.

Response to Arguments

19. Applicant's arguments with respect to claims 1, 5, 8, 17, 20- 24, and 26-33 have been considered but are moot in view of the new ground(s) of rejection.

20. Applicant's arguments filed 6/25/2003 have been fully considered but they are not persuasive.

In response to applicant's assertions that terms such as "aniline derivative" are commonly accepted practice in claim language, the Examiner respectfully disagrees. There are innumerable derivatives of a compound and it would be unclear to one of ordinary skill in the art what derivative of a compound is intended to be claimed by applicant.

Allowable Subject Matter

21. Claims 1-10, and 17-33 are allowed.

Conclusion

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Goebel (US 4,020,248) discloses a primary cell comprising a cathode structure comprising a plurality of layers of cathode material which are interposed between alternating layers of a cathode current collector material (col. 3, lines 10-17 and Figure 3) and the cathode material comprises carbon black as the active material (col. 3, lines 50-57).

Gan (US 2001/0049032 A1) discloses a sandwich cathode structure comprising two spaced apart cathode current collectors having a first cathode active material sandwiched between them and a second cathode active material different from the first that is contacted to the opposite sides of the two current collectors (see paragraph 29) and the first cathode active material may be a variety of metal oxides given in paragraph 25 of the reference and the second cathode active material may be a carbonaceous compound prepared from carbon and fluorine which includes graphitic and nongraphitic forms of carbon such as coke, charcoal or activated carbon (see paragraph 24 of the reference).

Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (703) 305-0588. The examiner can normally be reached on Monday through Friday from 9:30 AM to 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (703) 308-2383. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

st/ Susy Tsang-Foster

Susy Tsang-Foster
Primary Examiner
Art Unit 1745